

What is Claimed is:

1. A method of identifying a compound that selectively modulates at least one TLR-mediated cellular activity, the method comprising:
  - 5 (1) providing an assay to detect modulation of a TLR-mediated cellular activity for each of a plurality of TLRs;
  - (2) performing each assay using a test compound; and
  - (3) identifying the test compound as a compound that selectively modulates at least one TLR-mediated cellular activity if the test compound modulates a first TLR-mediated cellular activity to a different extent than it modulates at least one second TLR-mediated cellular activity.
- 10 2. The method of claim 1 wherein the compound modulates a first TLR-mediated cellular activity and does not modulate at least one second TLR-mediated cellular activity.
- 15 3. The method of claim 1 wherein the plurality of TLRs comprises TLR6.
4. The method of claim 1 wherein the plurality of TLRs comprises TLR7.
- 20 5. The method of claim 1 wherein the plurality of TLRs comprises TLR8.
6. The method of claim 1 wherein the plurality of TLRs comprises TLR9.
- 25 7. A compound identified according to the method of claim 1.
8. A pharmaceutical composition comprising a compound identified according to the method of claim 1 or a prodrug thereof.
- 30 9. A method of identifying a target compound having a TLR modulation profile that conforms to a target TLR modulation profile, the method comprising:
  - (1) selecting a target TLR modulation profile;
  - (2) determining the TLR modulation profile of a test compound; and

(3) identifying the test compound as a target compound if the TLR modulation profile of the test compound conforms to the target TLR modulation profile.

5        10.     The method of claim 9 wherein at least one TLR modulation profile comprises TLR6-mediated cellular activity.

11.     The method of claim 10 wherein at least one TLR modulation profile comprises modulation of TLR6-mediated cellular activity.

10

12.     The method of claim 11 wherein at least one TLR modulation profile comprises substantially no modulation of TLR7-mediated cellular activity.

13.     The method of claim 9 wherein at least one TLR modulation profile comprises  
15        TLR7-mediated cellular activity.

14.     The method of claim 13 wherein at least one TLR modulation profile comprises modulation of TLR7-mediated cellular activity.

15.     The method of claim 14 wherein at least one TLR modulation profile comprises  
20        substantially no modulation of TLR6-mediated cellular activity.

16.     The method of claim 14 wherein at least one TLR modulation profile comprises  
25        substantially no modulation of TLR8-mediated cellular activity.

25

17.     The method of claim 9 wherein at least one TLR modulation profile comprises  
TLR8-mediated cellular activity.

18.     The method of claim 17 wherein at least one TLR modulation profile comprises  
30        modulation of TLR8-mediated cellular activity.

19.     The method of claim 18 wherein at least one TLR modulation profile comprises  
substantially no modulation of TLR7-mediated cellular activity.

20. The method of claim 9 wherein at least one TLR modulation profile comprises TLR9-mediated cellular activity.

5 21. The method of claim 20 wherein at least one TLR modulation profile comprises modulation of TLR9-mediated cellular activity.

22. The method of claim 9 wherein the target TLR modulation profile includes one or more TLR-mediated cellular activities that are not detectably modulated by a target  
10 compound.

23. A compound identified as a target compound according to the method of claim 9.

15 24. A pharmaceutical composition comprising a target compound identified according to the method of claim 9 or a prodrug thereof.

25. A method of selectively modulating cells of the immune system, the method comprising:

20 (1) identifying a first immune system cell population and a second immune system cell population;

(2) selecting a compound that modulates a TLR-mediated cellular activity of the first cell population to a different extent than it modulates a TLR-mediated cellular activity of the second cell population; and

25 (3) contacting cells of the immune system with the selected compound in an amount effective to modulate a TLR-mediated cellular activity of at least one of the cell populations.

30 26. The method of claim 25 wherein the method further comprises determining the TLR expression profile of the first cell population and the TLR expression profile of the second cell population.

27. The method of claim 26 wherein the step of selecting a compound comprises comparing the TLR expression profile of the first cell population and the TLR expression profile of the second cell population with a TLR modulation profile of the compound.

5

28. The method of claim 25 wherein modulating cells of the immune system comprises detectably activating the cells or detectably inhibiting the cells.

10

29. The method of claim 25 wherein the compound modulates the first cell population and does not detectably modulate the second cell population.

30. The method of claim 25 wherein the compound modulates both cell populations.

15

31. The method of claim 25 wherein at least one cell population is modulated *in vitro*.

32. The method of claim 25 wherein at least one cell population is modulated *in vivo*.

20

33. The method of claim 25 wherein at least one immune system cell population comprises plasmacytoid dendritic cells.

25

34. The method of claim 25 wherein at least one immune system cell population comprises monocytes-derived dendritic cells.

35. A method of treating a condition treatable by selective modulation of a plurality of TLR-mediated cellular activities in a subject, the method comprising:

30

- (1) identifying a target TLR modulation profile effective for treatment of the condition;
- (2) selecting an IRM compound having a TLR modulation profile that conforms to the target profile; and

(3) administering to the subject an amount of the IRM compound effective for treating the condition.

5 36. The method of claim 35 wherein at least one TLR modulation profile comprises TLR6-mediated cellular activity.

37. The method of claim 36 wherein at least one TLR modulation profile comprises modulation of TLR6-mediated cellular activity.

10 38. The method of claim 37 wherein at least one TLR modulation profile comprises substantially no modulation of TLR7-mediated cellular activity.

15 39. The method of claim 35 wherein at least one TLR modulation profile comprises TLR7-mediated cellular activity.

40. The method of claim 39 wherein at least one TLR modulation profile comprises modulation of TLR7-mediated cellular activity.

20 41. The method of claim 40 wherein at least one TLR modulation profile comprises substantially no modulation of TLR6-mediated cellular activity.

42. The method of claim 40 wherein at least one TLR modulation profile comprises substantially no modulation of TLR8-mediated cellular activity.

25 43. The method of claim 35 wherein at least one TLR modulation profile comprises TLR8-mediated cellular activity.

30 44. The method of claim 43 wherein at least one TLR modulation profile comprises modulation of TLR8-mediated cellular activity.

45. The method of claim 44 wherein at least one TLR modulation profile comprises substantially no modulation of TLR7-mediated cellular activity.

46. The method of claim 35 wherein at least one TLR modulation profile comprises TLR9-mediated cellular activity.

5 47. The method of claim 46 wherein at least one TLR modulation profile comprises modulation of TLR9-mediated cellular activity.

48. The method of claim 35 wherein the target TLR modulation profile includes one or more TLR-mediated cellular activities that are not detectably modulated by the IRM compound.

10

49. The method of claim 35 wherein the IRM compound is a TLR6-selective compound.

15 50. The method of claim 35 wherein the IRM compound is a TLR7-selective compound.

51. The method of claim 35 wherein the IRM compound is a TLR8-selective compound.

20 52. The method of claim 35 wherein the IRM compound is a TLR9-selective compound.

53. The method of claim 35 wherein the condition is an infectious disease or a neoplastic condition.

25

54. The method of claim 53 wherein the infectious disease is a viral disease, a fungal disease, a parasitic disease, a bacterial disease, or a prion-mediated disease.

30 55. The method of claim 53 wherein the neoplastic condition is an intraepithelial neoplasm, a pre-cancerous neoplasm, or a cancer.